drifts overarched the houses in many villages, and for several days interrupted travel.

Although 1900 was warmer than usual, the maximum temperatures have been lower than in other years. The highest temperature of the year was 37.5° C. at Giurgiu, and the lowest —30.0° at Pancesci-Dragomiresci. From the previous records, we find extremes of +42.8° C. at Giurgiu in 1896 and —35.6° C. at Striharet in 1893. The mean annual temperature at Bukharest for 1900, 11.2°, is 0.9° above the normal, and has been exceeded but four times during the last thirty years.

Table 2 gives data for Bukharest for 1900, and also for the entire period of observations, 1885–1900.

TABLE 2.—*Data for Bukharest for 1900, with entire period of observations, 1885–1900. Latitude 44° 25′ N.; longitude 26° 6′ E.; altitude, 74 meters.*

1900.	Temperature in degrees centigrade.							Mean relative humidity.
	Mean.			Extremes.		Daily range.		
	Month.	Max.	Min.	Max.	Min.	Greatest.	Least.	
January	— 2.5	0.5	— 5.0	9.5	—14.2	12.0	1.0	93
February	2.7	5.7	0.2	11.5	— 3.9	11.5	1.8	91
March	1.8	6.3	— 1.7	14.8	— 9.1	14.5	2.7	83
April	10.5	16.3	5.6	24.2	— 0.4	15.6	7.0	76
May	16.0	22.8	14.0	30.5	3.0	19.3	4.8	69
June	20.5	27.6	14.0	34.5	10.6	18.5	8.5	67
July	23.0	29.7	16.8	34.9	10.5	17.5	6.6	63
August	22.4	28.9	16.0	34.5	12.4	19.6	4.7	60
September	16.7	23.9	9.5	30.5	6.4	20.0	6.1	64
October	13.8	20.9	7.6	30.5	— 1.8	18.7	3.2	71
November	7.4	9.9	5.0	16.0	0.4	13.3	1.5	84
December	1.5	5.2	— 1.2	12.1	— 5.3	12.4	2.1	84
Year	11.2	16.2	6.4	34.9	—14.2	20.0	1.0	75
Period, 1885–1900	10.3	16.2	5.1	40.1	—30.5	.....	.....	73

1900.	Wind.		Precipitation.			Mean cloudiness.
	Mean velocity. Miles per hour.	Prevailing direction.	Total.	Max. in 24 hours.	Number of days with 0.1 millimeter.	
			mm.			
January	11.2	ene.	81.6	21.5	14	8.7
February	9.4	ene.	61.8	18.7	19	8.4
March	12.5	ene.	80.1	25.8	11	6.3
April	12.8	ene.	43.2	13.4	11	6.4
May	9.8	ene.	49.9	14.5	12	6.1
June	7.6	wsw.	97.1	51.4	13	5.0
July	7.2	wsw.	66.3	29.7	10	4.0
August	9.2	ene.	117.5	83.6	7	3.6
September	4.9	ene.	24.1	12.4	4	2.5
October	6.9	ene.	28.3	13.0	9	4.2
November	10.3	ene.	43.9	17.8	13	8.9
December	10.5	wsw.	39.3	18.1	6	6.2
Year	9.4	ene.	733 2	83.6	129	5.8
Period, 1885-1900	8.5	ene	604.8	....	.....	5.2

F. O. S.

THE BULLETINS OF THE JAPANESE SERVICE.

The Central Meteorological Observatory of Japan has begun the publication of a new series of bulletins, whose purpose is thus explained in the preface to the first number.

With the present number begins a new series of our publications, under the title of the Bulletin of the Central Meteorological Observatory of Japan. The bulletin is not intended to be published periodically, yet it is proposed to issue the successive numbers at suitable intervals. This publication chiefly contains the results of researches on meteorology and allied sciences made by the members of this observatory. In addition, it is also intended that observations and their discussions on special subjects, which are not included in the routine work of our service, will be published in these reports.

We sincerely hope that by the present bulletins, together with the monthly and annual reports, the general features of meteorology of Japan may be known to the public.

The present number contains the following memoirs:

1. W. Oishi.—Observations of the earth temperature at Tokio.

A period of seven years, 1886–1892, is covered by the observations, which were made at the surface of the ground and at nine different depths, from .05 meter to 7.0 meters. The surface temperature was observed with an ordinary mercurial thermometer laid on the ground, with the bulb just covered with earth. The results, as regards daily and annual ranges and retardation of extremes, do not materially differ from those obtained elsewhere.

2. Y. Wada.—Température moyenne annuelle de la surface de la mer dans l'océan pacifique occidental.

The author presents the results of observations taken from more than 6000 logs furnished by 1086 ships, both native and foreign, and extending over a period of twenty years, from 1882 to 1901. The region studied is comprised between the one hundred and fourteenth and one hundred and forty-sixth meridians and the twenty-second and forty-sixth parallels, and extends from the Strait of Formosa to the southern corner of the Sea of Okhotsk and from the Chinese coast to about 300 miles east of the Japanese Archipelago. The total number of observations was 133,255, of which about two-thirds were taken during the warmer half of the year and 80 per cent in the Japan Sea and the waters in the neighborhood of the Archipelago proper. Mean temperatures only are considered in this paper.

The highest monthly means occurred generally in August and varied from 30° C. in the Strait of Formosa to 19° C. in the Sea of Okhotsk. The lowest means ranged from —3° in the Gulf of Pechili and in the neighborhood of Vladivostock to 16° off the west coast of Kiushu, and occurred from December to March. The greatest range of temperature occurs in the Gulf of Pechili, where a difference of 27° between the August and February means exists, while a range of but 6° is noted in the vicinity of Formosa. In general, the influence of the ocean currents on the surface temperatures is clearly shown. A table gives the monthly and annual means for each 2-degree square, and these are shown graphically on thirteen charts.

3. T. Okada.—The epochs of occurrence of the first ice in Japan for 1902.

The purpose of this investigation was not to observe the formation of ice on natural bodies of water, but to determine the relative dates of first freezing under artificial and identical conditions. The results might then be accepted as to some extent an exponent of the effect of orography upon climate, a matter of especial interest in a country with the diversified surface and latitudinal extent of Japan.

Observations were made during 1902 at twenty of the meteorological stations, using the ordinary evaporation gage, a copper cylinder two decimeters in diameter and one decimeter in depth, retaining its natural copper color on the outside, but plated on the inside with a pale white zinc alloy. These are set on the surface of ground covered with sod, freely exposed to the sun and wind, and filled with pure well water to a depth of two centimeters at 10 o'clock every morning. The author draws the following conclusions:

In all places frost precedes the ice in the evaporation gage, and the minimum air temperature below 0° C. comes after the first ice.

The date of the first ice retards in general as we proceed toward the south. The variation of the date of the first ice with latitude is about six days per degree.

The distance from the coast, the height above sea level, or orographic conditions characteristic to the *continentality* of the climate, accelerate or retard the occurrence of first ice. Take, for example, the two stations, Takayama and Fukui, under the same latitude. At the former station, lying on the plateau in central Japan, water freezes on the 5th of November, while at the latter, situated near the coast of the Sea of Japan, ice occurs first on the 25th of the same month. The difference is twenty days.

Lines showing the simultaneous occurrence of first ice run almost parallel to the coast line, showing the remarkable influence of the distribution of land and sea on the date of the first ice. The general course of the lines on the chart bears a striking resemblance to that of winter isotherms.

The topographical feature of the observing place seems to have a very great influence on the occurrence of first ice.

It is obvious that the relative dates would be modified, or even in some cases reversed, by varying the standard as regards either the amount of water, the nature of the containing vessel, or the hour at which it is filled. A wide range of experiments along these lines might be carried out. The use of distilled water would also be an improvement.

4. T. Okada.—Evaporation in Japan.

The evaporimeter used is described above. Results are presented from fifty stations, from Formosa, in the Tropics, to Nemuro, in latitude 43° north. The author finds that—

The annual variation of evaporation in this country is governed by rather simple laws. The variation of evaporation presents double maxima and minima. The evaporation increases gradually from January to May and reaches a minimum in June. Then it increases abruptly to a maximum in August, and again decreases abruptly to the minimum in January. These variations can be easily accounted for by considering the effect of the temperature and sunshine duration. * * * Evaporation is greatest in the Formosa and Liukiu islands and smallest in the eastern Hokkaido, showing undeniably the remarkable influence of the temperature on this climatological element. In Formosa, lying under the Tropics, the annual evaporation amounts to 1500 millimeters in average, while in Hokkaido, sharing the arctic climate of Kuriles, it is below 800 millimeters. * * *

The abnormally great evaporation in the Inland Sea region is due to the large amount of bright sunshine that there prevails. This portion of the country is completely surrounded by high mountain ranges, so that wet winds lose their loaded vapor by passing these gigantic barriers and turn into dry ascending currents of the air which excite the evaporation of water in that region. * * * The greatest annual evaporation is 1910 millimeters at Koshun in southern Formosa, and the least is 726 millimeters at Kushiro in eastern Hokkaido.

Mr. Okada discusses also the effects of wind, precipitation, and orography, and the reduction of evaporation for altitude, and presents, in a number of tables, the average annual, monthly, and daily evaporation, together with the figures for each month and year at sixteen selected stations.—*F. O. S.*

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. James L. Bartlett, Observer, Madison, Wis., will act as instructor in meteorology at the University of Wisconsin. The course in meteorology, which will be offered for the first time during the present school year, is described in the university catalogue as "Meteorology: an elementary course in the theory and practise of meteorology with especial reference to the work of the U. S. Weather Bureau. Second semester. Three hours per week."

Mr. Joseph L. Cline, Observer, Corpus Christi, Tex., has been appointed instructor in meteorology in the high school of that city. The board of school trustees expects to make this subject a permanent feature of the curriculum. The course will consist of the general study of meteorology; meteorological instruments, their construction and errors; laboratory work in constructing weather maps; forecasting; and climate in relation to agriculture, commerce, and mankind; effects upon the human race. Meteorology is obligatory in the junior and senior years. The class this year consists of 26 pupils, and the first lesson was given September 14, 1904. Mr. Cline states that with the exception of the State Medical College, where Dr. I. M. Cline delivered a series of lectures, this is the first educational institution in Texas to adopt a regular course in meteorology.

Mr. E. D. Emigh, Assistant Observer, Dodge, Kans., reports that the high school class in physical geography visited the office on September 27, and received instruction in the use of the instruments and the work of the office.

Mr. F. P. Chaffee, Section Director, Montgomery, Ala., spoke, on the 10th instant, before the Montgomery County Agricultural Association, on the subject of the Weather Bureau and the value of its work. He paid particular attention to the methods of protecting crops from damage by frost, and touched on the harmful effects of "long-range" forecasting as at present attempted.

RAINFALL IN FIJI.

[From the Quarterly Journal of the Royal Meteorological Society. July, 1904. vol. 30, p. 252.]

Mr. R. L. Holmes, of Delanasau, Bua, Fiji, has sent us the following summary of his rainfall for 1903. The rain gage is 77 feet above sea level, and 1 mile from the sea.

1903.	Rainfall.	No. of rainy days.	Greatest daily fall.
	Inches.		*Inches.*
January ...	7.75	16	2.02
February ..	3.68	12	1.06
March	7.37	18	4.00
April	5.25	12	1.76
May	0.78	7	0.40
June.....	1.75	5	1.23
July	3.72	7	1.64
August	0.59	3	0.25
September .	0.45	6	0.17
October....	7.59	9	3.82
November .	6.45	6	2.74
December..	7.17	18	1.25
Year...	52.55	119	4.00

The rainfall for 1903 was the lowest registered during the previous thirty-two years, the next lowest being 56.87 inches in 1878. The average for the thirty-two years is 95.08 inches. The greatest yearly fall was 159.51 inches in 1871.

The rainfall for 1893 was also greatly in defect in other parts of Fiji, as will be seen from the following amounts for 1902 and 1903 in the island of Viti Levu:

Stations.	1902.	1903.
	Inches.	*Inches.*
Vuci Maca.....	113.22	61.49
Korociriciri....	106.95	75.94
Nausori	122.79	76.35
Naitasiri	126.78	106.78
Muanaweni....	155.49	122.01
Nadarivatu	128.43	66.38
Ba.....	85.70	57.10
Lautoka	65.98	42.62

PROFESSOR WARD ON THE CLIMATE OF THE UNITED STATES.

Prof. Robert DeC. Ward contributes a brief and interesting account of our climate to the June number of the Geographical Teacher.[1] While the American climatologist may find no new facts in these pages, he will be interested in the concise, lucid, and comprehensive treatment of so large a subject in so small a space.

Professor Ward divides the country into three climatic zones: First. The eastern climatic province, extending from the Atlantic Ocean to the one hundredth meridian, with warm summers and cold winters, differing but little in general climatic features from east to west, but with strong winter temperature gradients from north to south; influenced but slightly by the ocean on its eastern border and subjected to the sudden local weather changes attending the passage of cyclonic storms; favored by a sufficient and seasonable rainfall, varying from 60 inches near the Gulf and on the south Atlantic coast to 20 inches at about the one hundredth meridian, so that "the world hardly contains so large an area as this so well adapted to civilized occupation."

Second. The western plateau and mountain region, lying between the one hundredth meridian and the Sierra Nevada and Cascade ranges, having great differences of altitude and

[1] The climatology of the United States; an outline. The Geographical Teacher, London. Vol. 2, pp. 212–218.